

12/10/2016

الإثنين

عبد. ف

2 صفحة

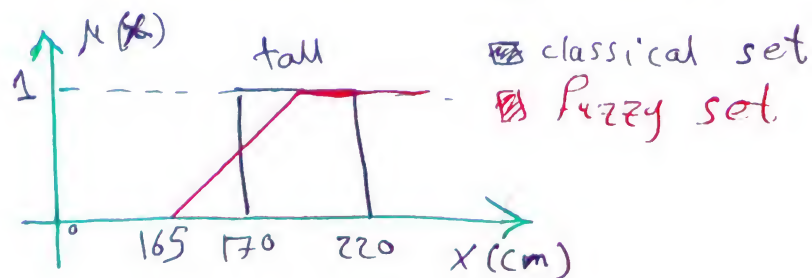
① Explain the limitations of using conventional controllers

- ① System non-linearity
- ② System uncertainty
- ③ Uncertainty in measurements
- ④ temporal behavior
- ⑤ Multivariable and multiloop, and environment constraints
- ⑥ imprecise/vague knowledge of human expert

② What are the advantages of fuzzy controllers.

- ① more robustness
- ② cheap in costs
- ③ Customizable
- ④ Easy to design and implement.

③ Explain with example the main difference between a binary and a fuzzy sets



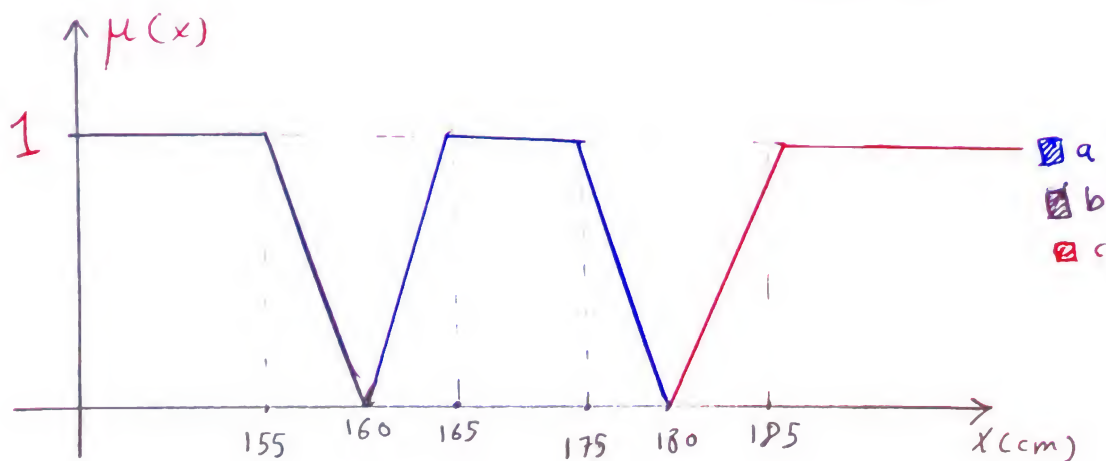
④ What's meant by universe of discourse of fuzzy set?

It's a range of all possible values considered to the fuzzy set.

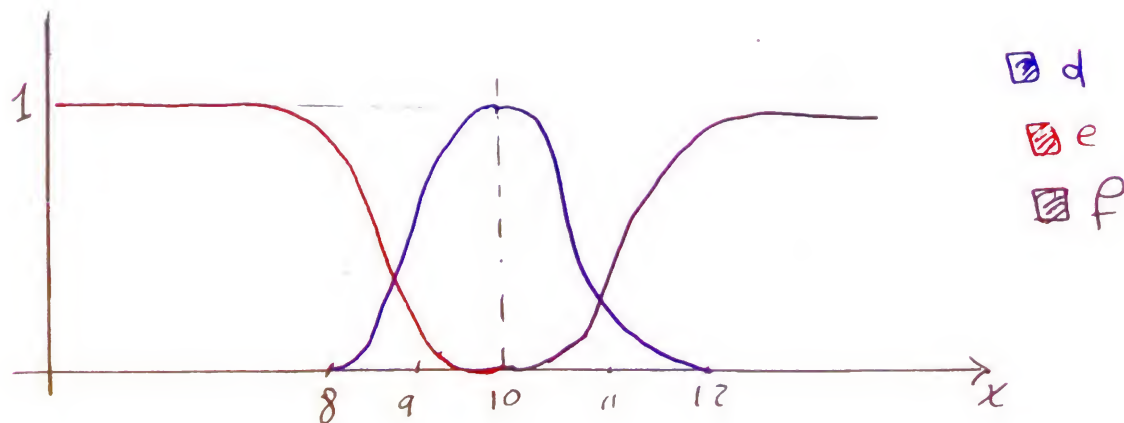
5) Draw the membership fns that:

- quantifies the set of all people of medium heights
- quantifies ; ; ; short people
- ; ; ; tall ;
- the statement "the no.  $x$  is near 10"
- " ; ; ; less than 10"
- " ; ; ; greater than 10"
- Repeat (d)-(f) for 5 rather than 10

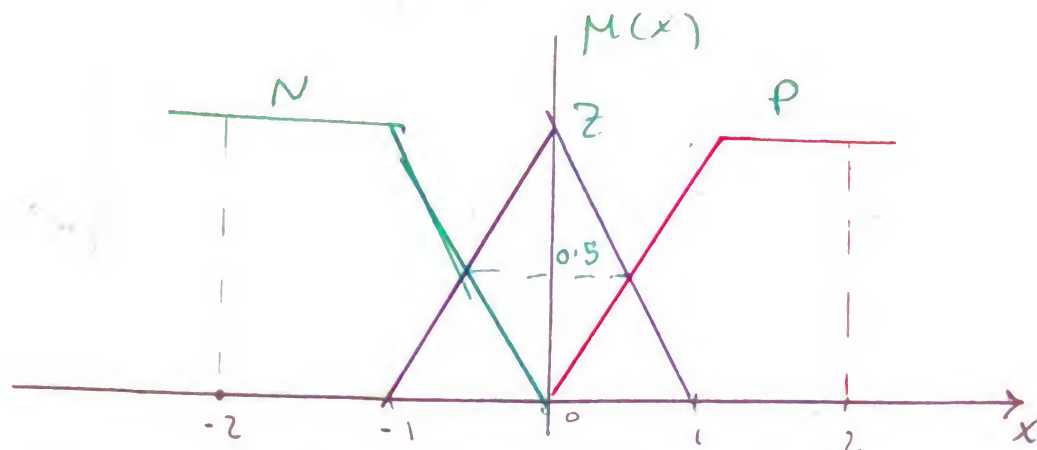
a, b, c



d, e, f



6)



- a) For  $x = -0.25 \rightarrow \mu_Z(-0.25) = 0.75; \mu_N(-0.25) = 0.25$   
 $x = +0.25 \rightarrow \mu_P(0.25) = 0.25; \mu_Z(0.25) = 0.75$   
 $x = -0.1$   
 $x = 0.1$   
 $x = 0.5 \rightarrow \mu_Z(0.5) = 0.5; \mu_P(0.5) = 0.5$   
 $x = -0.5$

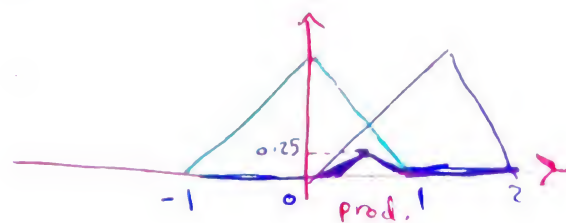
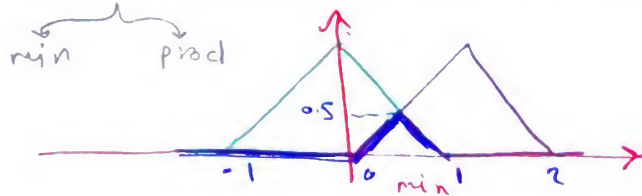
- b)  $\text{support}(Z) = ]-1, 1[$ ;  $\text{support}(N) = ]-\infty, 0[$   
 $\text{support}(P) = ]0, \infty[$   
 $\text{Core}(Z) = 0$ ;  $\text{Core}(N) = ]-\infty, -1]$ ;  $\text{Core}(P) = [1, \infty[$

- ⑦ Long pencils =  $\{P_1/0.1; P_2/0.2; P_3/0.4; P_4/0.6; P_5/0.8; P_6/1\}$   
medium pencils =  $\{P_1/1; P_2/0.6; P_3/0.4; P_4/0.3; P_5/0.1\}$   
 $L \cup M = \{P_1/1 + P_2/0.6 + P_3/0.4 + P_4/0.6 + P_5/0.8 + P_6/1\}$   
 $L \cap M = \{P_1/0.1 + P_2/0.2 + P_3/0.4 + P_4/0.3 + P_5/0.1\}$   
 $L' \text{ AND } M' = L' \cap M' = (L \cup M)' = \{P_2/0.4 + P_3/0.6 + P_4/0.4 + P_5/0.2\}$



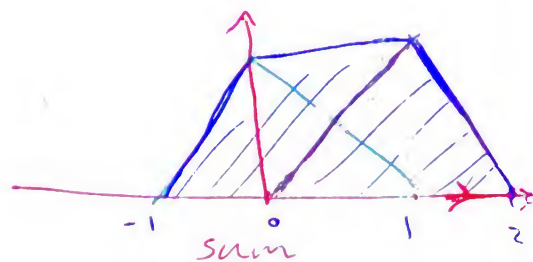
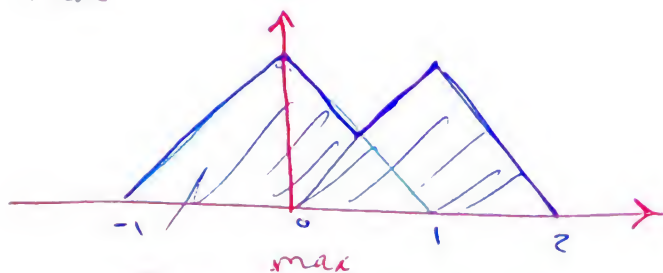


① Zero and possmall  $\Rightarrow$  Zero  $\cap$  possmall

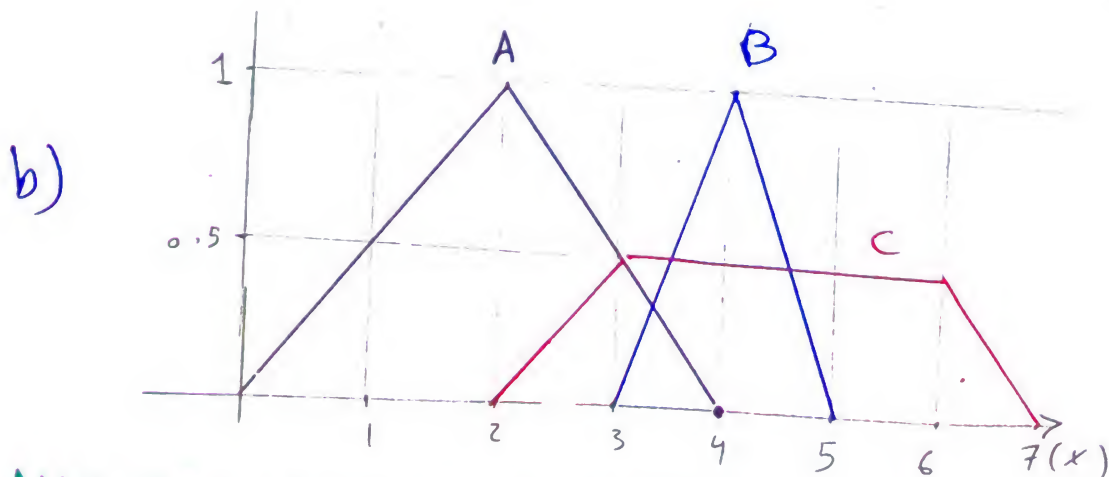
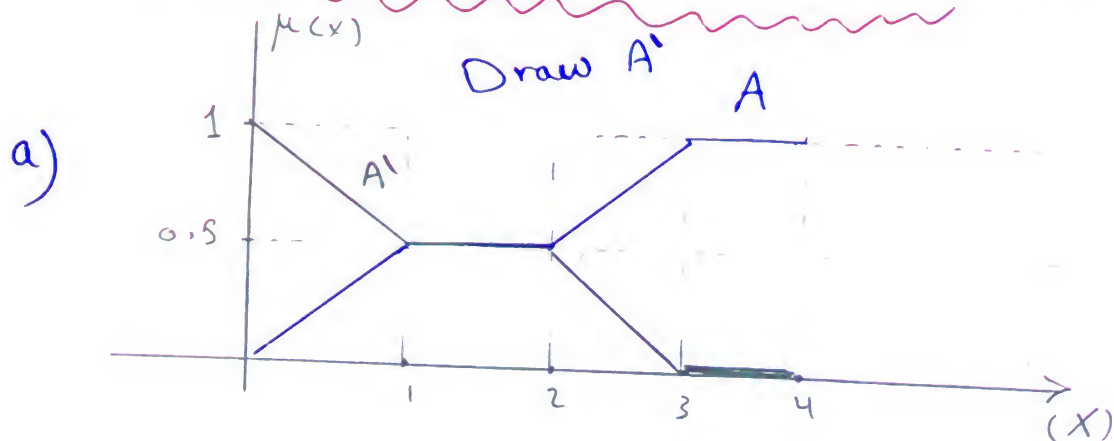


② Zero or possmall  $\Rightarrow$  Zero  $\cup$  possmall

max  
sum



10



AUC; ANC; AUB; ANB; AUBUC; ANBAC

(this is getting tedious, solve it by yourself -\_-)

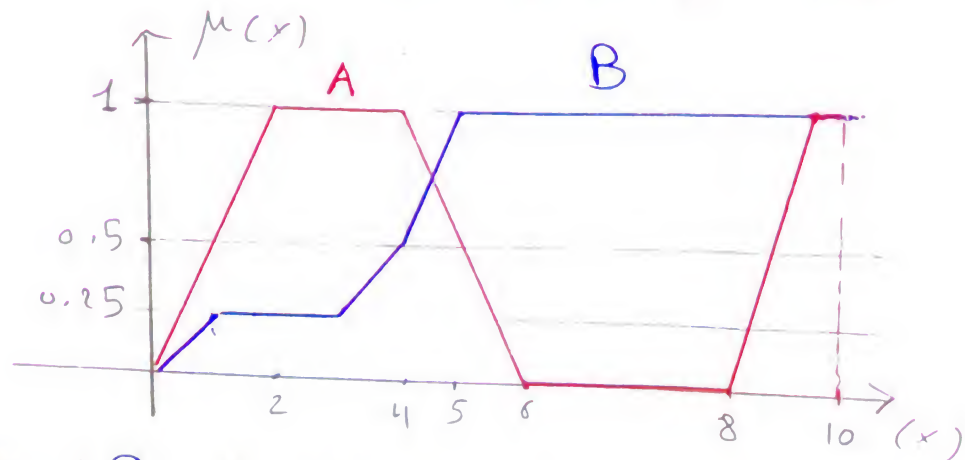
or just check pages 6-7-8 :D

Report (like the dr's one)



Choose one of the fuzzy controller's application and explain in brief the role of fuzzy controller in that app.

(11)



State if A and B are convex or not  
Normal or Subnormal

A) Convex ; Normal

B) Convex ; Normal

9. Choose one of the fuzzy controller's applications and explain in brief the role of the fuzzy controller in this application.

(Report)

10. For the following fuzzy sets:

Draw  $A^*$



Draw:



a)  $A \cup C$



MAY



Q AUB



Q ADB



Q ADBUC



Fuzzy Logic Control (FLC)

г)  $A \cap B \cap C$

